CHAPTER FOUR

Performance Element

CMAs must evaluate how well their transportation systems are doing in meeting their CMP objectives of reducing congestion and improving air quality.[18] Specifically, the CMP must contain performance measures that evaluate how highways and roads function, as well as the frequency, routing and coordination of transit services. The performance measures should support mobility, air quality, land use and economic objectives and be used in various facets of the CMP.

Combined with LOS standards, the Performance Element provides a basis for evaluating whether the transportation system is achieving the broad mobility goals in the CMP. These include developing the Capital Improvement Program, analyzing land use impacts and preparing deficiency plans to address problems. The legislation intends for the Performance Element to include new performance measures, in addition to roadway LOS and transit routing, frequency and service coordination. However, only the roadway LOS standards will be used to trigger the need for a deficiency plan.

Integrating these CMP elements may occur in the future, after gaining some experience in implementing the Performance Element. For the 2007 CMP, implementing the Performance Element will help the CMA prioritize projects for funding and develop management and operations strategies.

The CMA Board adopted the following guiding principles to use in developing the Performance Element:

- Keep it simple and manageable;
- Be cost-effective, relying on available data and established monitoring processes;
- Use the CMA's long-range transportation goals and MTC's multimodal programming criteria as a philosophical framework;
- Use measures that can be presented in easy-to-understand and consumer-oriented terms;
- Consider an array of measures since one measure will not serve all needs; and
- Satisfy state AB 1963 and federal ISTEA and Transportation Equity Act for the 21st Century (TEA-21) requirements.

[18] California Government Code Section 65089(b)(2)

RELATIONSHIP TO THE COUNTYWIDE TRANSPORTATION PLAN

The philosophical framework envisioned for the Performance Element is to relate performance measures to the (1) goals and management strategies in the 2001 *Countywide Transportation Plan* and (2) policies set forth in the CMP. Figure 9 shows how the Performance Element relates to other responsibilities of the CMA. Table 9 shows the relationship between performance measures and the long-range goals the CMA Board adopted. Measures of the transportation system's performance will provide feedback on the effectiveness of management strategies and investment decisions.

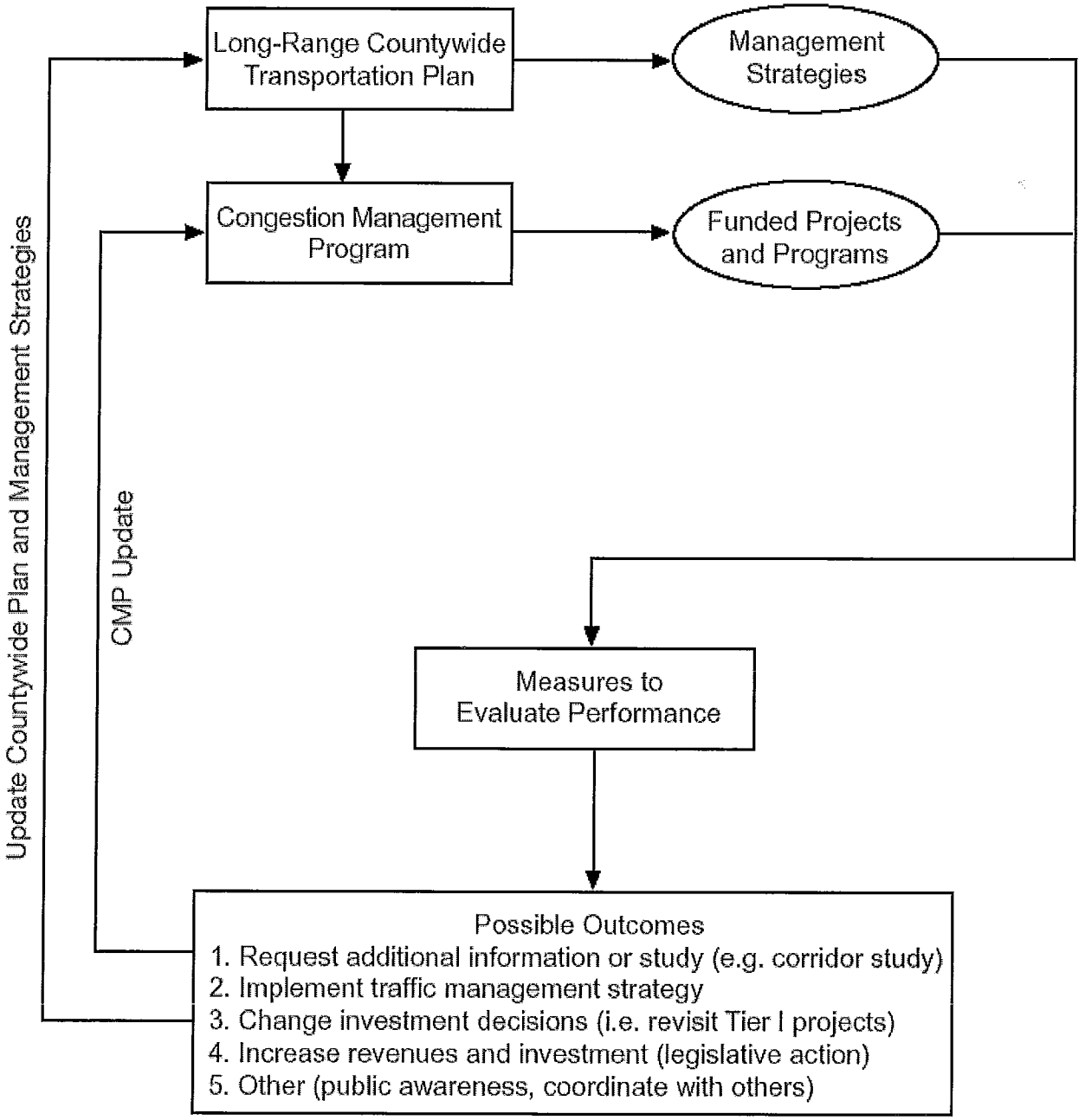
PERFORMANCE MEASURES

Performance measures to be used are listed in Table 9. The measures encompass all modes of transportation. Peak and off-peak travel periods are considered for typical weekdays. Measurements of current conditions rely primarily on available data and established data collection processes.

The recently updated countywide travel model can forecast the following additional performance measures:

- Person trips by mode
- Vehicle volume by roadway segment
- Vehicle miles traveled by facility type
- Modal share
- Volume-to-capacity (v/c) ratios by facility type
- Vehicle hours of travel by facility type
- Lane miles by v/c ratio
- Person miles traveled by mode
- Passenger boarding by operator or line
- Travel time by mode
- Travel speed by mode
- Vehicle hours of delay by facility type
- Duration of congestion by facility
- Time spent in congestion
- Transit accessibility

Figure 9—How Performance Measures are used in the CMP



Acceptability of Data

A suggested approach to ensure that data collection methods are acceptable to the CMA is described in "Establishing the Existing Level of Service for the Alameda County CMP-designated Roadway System".[19] This applies to speed and travel time data. An ongoing process will be necessary to review definitions and methods to ensure that the information is collected in a consistent manner prior to use in trend analyses.

System Definition

While the statutes clearly require designation of a CMP-network for purposes of LOS monitoring, they provide no guidance for selecting a system for the Performance Element.

The CMA will use the Metropolitan Transportation System for the Performance Element. MTC recognizes the MTS in the context of programming decisions as well as in estimating roadway maintenance needs. The CMA also recognizes the MTS in the Land use Analysis Program as the focus of transportation analyses.

Description of Performance Measures

Average Highway Speeds

As currently measured by the CMA, this is the average travel speed of vehicles over specified segments measured in each lane during peak periods. This measurement is made a sufficient number of times to produce statistically significant results.

Travel Time

Calculated for up to 10 pairs of origins and destinations (O-D) using floating car data to determine average roadway travel time and transit time between these O-D pairs. These O-D pairs will reflect major corridors in Alameda County.

Duration of Traffic Congestion

As defined by Caltrans, this is the period of time during either the a.m. or p.m. peak that a segment of roadway is congested (average speed is less than 35 m.p.h. for 15 minutes or more). Data are collected by Caltrans, recently by MTC, from floating car runs conducted in April/May and September/October each year and reported annually. The CMA may be able to collect similar data on the remainder of the CMP-network by conducting floating car runs earlier or later, where necessary, to observe the beginning and ending of the congested period.

Roadway Maintenance

As defined by MTC, this is based on the roadway Pavement Condition Index (PCI) used in MTC's Pavement Management System. The PCI is a measure of surface deterioration on streets and roads.

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[19] Abrams Associates, November 26, 1991

Roadway Accidents

The number of accidents per one million miles of vehicle travel is determined. Caltrans collects the data as a part of the State Switter/TASIS System.

Percent of Countywide Bike Plan Completed

Measured in terms of the number of miles and the percentage completed of the countywide bicycle plan. Focus will be on the progress of the high priority projects included in the bicycle plan.

Transit Routing

This measure refers to both the pattern of the transit route network (e.g., radial, grid, etc.) and the service area covered (e.g., percent of total population served within one-quarter mile of a station/bus stop or percent of total county served, etc.). Measurement of routing performance may be applied at the corridor or screenline level, to give operators flexibility in locating service routes.

Frequency of Transit Service

This refers to the headway, or the time between transit vehicles (e.g., one bus arrival every 15 minutes). Service should be frequent enough to encourage ridership, but must also consider the amount of transit ridership the corridor (or transit line) is likely to generate. It also considers the capacity of the existing transit service in that corridor.

Transit Service Coordination

This measure refers to coordination of transit service provided by different operators (e.g., timed transfers at transit centers, joint fare cards, etc.). Performance should be aimed at minimizing inconvenience to both the infrequent and frequent user. Information provided by transit agencies should address the questions: Is there coordination and how convenient is it?

Transit Ridership

The number of average daily passengers boarding or de-boarding transit vehicles in Alameda County.

Transit Vehicle Maintenance

AC Transit and the Livermore-Amador Valley Transit Authority (LAVTA) refer to "Miles between Mechanical Road Calls" as a performance measure, defined as the removal of a bus from revenue service due to mechanical failure. BART and Altamont Commuter Express (ACE) have a related term known as "Mean Time between Service Delays." Delays can be caused by personnel or by mechanical failures.

Table 9—Performance Measures

PERFOR-MANCE MEASURE	LONG-RANGE GOAL	OBJ. IN STATUTE	REQ'D DATA	HOW RESULTS CAN BE USED	CAUTIONARY NOTES CONCERNING DATA USE
Average Highway Speeds	Improve Mobility Air Quality	Mobility Air Quality	Current Requirement Average speeds on CMP network	LOS determinations. Trigger Deficiency Plans. Evaluate direct effectiveness of projects in relieving congestion.	Adequate for determining CMP conformance. Caution in use as a measure of mobility.
Travel Time Transit, Highways, HOV Lanes	Improve Mobility Increase Transit Use Improve Air Quality	Mobility Air Quality Land Use	Average travel time between selected origin-destination pairs. Obtain from biennial LOS monitoring data and transit schedules	Useful in analyzing trends, comparing alternatives or as an evaluation of the effectiveness of the Countywide Transportation Plan. Problems can be spotted for targeted investment. Can compare travel times via roadway and transit along major corridors.	Caution in a reliance on data collected on a few days each year which is not always representative of conditions throughout the year.
Duration of Traffic Congestion	Enhance Economic Vitality (Expedite freight movement)	Economic Air Quality	Hours of Congestion at key locations	Could be used as trigger for certain traffic management strategies to contain congestion to normal peak periods to maintain smooth truck travel during mid-day.	Caution in a reliance on data collected on a few days each year which is not always representative of conditions throughout the year.
Roadway Maintenance	Ensure serviceable operation of existing facilities	Economic	MTC's Pavement Condition Index	$ amount of maintenance backlog for MTS roadways. Useful in guiding investment decisions for roadway maintenance needs.	Reliability dependent on subjective assumptions made by local agency staff. Assumptions can change annually depending on staff person conducting the estimate.
Roadway Accidents on Freeways	Improve mobility, Ensure serviceable operation of existing facilities	Mobility Air Quality	Number of accidents/ number of miles; From Switter/ TASIS System	Identify safety issues. Useful in guiding investment decisions.	Data not available for local streets/roads. Accidents may not be caused by physical facilities.

PERFOR-MANCE MEASURE	LONG-RANGE GOAL	OBJ. IN STATUTE	REQ'D DATA	HOW RESULTS CAN BE USED	CAUTIONARY NOTES CONCERNING DATA USE
Completion of Countywide Bike Plan	Improve Mobility, Air Quality	Mobility Air Quality	Miles and Percent Completion of Bikeway Plan	Progress toward a connective system of countywide bikeways	Does not reflect actual use of bicycle facilities.
Transit Routing	Improve transit access and Increase transit use	Mobility Air Quality Land Use	Current CMP requirement	To determine area coverage and proximity of transit service to residential areas and job centers.	Proximity to transit stops or stations is an important indicator of accessibility; however, the data is difficult to collect.
Transit Frequency	Improve transit access and Increase transit use	Mobility Air Quality Land Use	Current CMP requirement Number of lines operating at each frequency level	To determine convenience of transit service.	
Coordination of Transit Service	Improve transit access and Increase transit use	Mobility Air Quality	Current CMP requirement	To determine reliability and convenience for travelers connecting between services.	Current CMP requirement does not provide much information.
Transit Ridership	Increase transit use	Economic Air Quality Land Use	Number of patrons	Trend analysis; comparison between operators	Does a loss of transit ridership indicate that investment in transit should increase or decrease?
Transit Vehicle Maintenance	Ensure serviceable operation of existing facilities	Air Quality	Mean time between Service Delays (BART) and Miles between Mechanical Road Calls (AC, LAVTA, Union City Transit)	Trend analysis; comparison between operators. Transit agencies have internal standards for comparison and investment allocation decisions.	

DETAILS ON TRANSIT SERVICE PERFORMANCE MEASURES

The following transit service performance measures are derived from the service standards of the transit operators in the county, as expressed in their short-range transit plans or other policy documents.

Frequency

Table 10 shows performance measures for bus and rail transit in Alameda County. These measures apply to both existing services and future year (proposed) services.

For ferry services from Alameda and Oakland to San Francisco, the frequency measure is one vessel per hour during the a.m. and p.m. peak periods.

There is currently no light-rail service in Alameda County. AC Transit is investigating the possibility of light rail as a service alternative several corridors.

Routing

Performance measures for routing and area coverage vary by transit operator. AC Transit bases current and future year bus route spacing (the average distance between bus lines) on residential densities, the location of major activity centers, topography and street patterns. Route spacing in commercial areas is determined by location, level of activity and layout of the development, on a case-by-case basis.

For existing and future services, LAVTA proposes the following performance measures:

○ Expand routes and services to meet current and future demand for timely and reliable transit service		
Provide service with a time span that is sufficient to effectively serve the primary target markets for each route.	0400 - 0100 h/day or 24-h in backbone corridor(s); 0500-0000 on primary feeder lines; 0530-0900 and 1500-1900 on secondary feeder lines and regional routes; bell time for tripper lines.	Ongoing
Provide trip frequencies that are sufficient to effectively serve the primary target markets for each route.	10/20 min in backbone corridor(s); 30/45 minutes on primary feeder lines; 30/60 min on secondary feeder lines; 60/0 min on regional routes; two daily trips for tripper lines. (peak/base)	Ongoing

For existing and future services, Union City Transit proposes the following performance measures:

- 90 percent of all land with three or more dwelling units per acre within one-quarter-mile of a transit route.
- 90 percent of major activity centers within one-eighth-mile of a transit route.

BART aims for a load factor (i.e., the number of persons on board divided by the number of seats) of 1.35 during peak periods. The average peak hour, peak direction transbay load factor for the four transbay routes is currently above 1.35, and closer to 1.5. During the early 1990s, BART aimed for a peak period load factor of 1.15 and an off-peak load factor of 1. With the opening of the Dublin/Pleasanton line, the target load factor was adjusted to 1.35. Given current ridership trends and limitations on available rail cars, load factors will likely rise in 2008.

Table 10—Performance Measures for Frequency of Transit Service

	TIME OF DAY				
SERVICE TYPE	Peak	Midday	Night	Owl	Sat/Sun/Holiday
	(minutes between services)				
Bus					
Primary Trunk	15	15	30	60	15
Secondary Trunk	15	30	30		30
Local	30	30	60		60
Suburban Local	45	60			
Transbay Basic	15	30	60		60
Transbay Express	30				
East Bay Express	30				
BART Express Bus*	60				
Rail					
BART	3.75-15		up to 20 (off-peak)**		
Ferries	60	60			60

* As of July 1, 1997, operating responsibility for BART express bus service was transferred from BART to local operators i.e., LAVTA and County Connection, except for the service in the I-80 corridor. Responsibility for this service was transferred to WestCat on July 1, 1998.

**Starting January 2008, Saturday daytime service will be five routes with up to 20 minute headways. All other off-peak times (Week Night/Weekend Night/Sunday/Holiday) will be three routes with 15 minute headways.

Transit Service Coordination

A number of measures are in place to ensure coordination among transit operators, including SB 602, legislation preceding SB 602, MTC Resolution No. 3055 (Inter-operator Transit Coordination Implementation Plan) and others. All transit operators in Alameda County will continue to implement the coordination projects required under these guidelines. Annually, the projects are agreed upon among the operators and MTC. They relate to coordinating the following:

- Fare
- Schedule
- Service

- Public information
- Marketing
- Administration

Review Process

The CMA will prepare an annual transportation Performance Report for review by local agencies and transit operators prior to publication. The report will include the most current available data from various agencies. (The CMA will accept performance data that is up to two years old.)

Preparation of the transportation Performance Report is recommended for the April-May period, in order to coincide with project prioritization for the *Countywide Transportation Plan* (Spring of even-numbered years) and the availability of the Caltrans or MTC's highway congestion monitoring data. The report will be available prior to the time when the CMA prioritizes transportation improvements for inclusion into the *Countywide Transportation Plan* and *Transportation 2030*.
The Performance Report includes estimates of population growth during the preceding year, available from the State Department of Finance. The 2006-07 Performance Report is available upon request at the CMA offices.

LOCAL GOVERNMENT AND TRANSIT AGENCY RESPONSIBILITIES

To minimize cost, the CMA will rely on established data collection processes and regularly published reports for data. A list of established data collection efforts, by agency, is listed below.

Cities and County

- Pavement Management System data for the MTS
- Countywide Bicycle Plan (County Public Works Department and CMA)

Transit Agencies

- Service Schedules, On-Time Performance
- Transit Ridership Routing (percentage of major centers served within 1/4-mile of a transit stop)
- Frequency (number of lines operating at each frequency level)
- Service Coordination (number of transfer centers)
- Average Time between Off-Loads (BART)
- Miles Between Mechanical Road Calls (AC Transit, LAVTA and Union City Transit)
  Mean Time Between Service Delays (BART and ACE)

MTC

- Roadway Maintenance Needs
- Freeway Congestion Monitoring data

Caltrans

- Freeway Speed Runs, Duration of Freeway Congestion (if developed by Caltrans)
- Accident Rates on State Freeways

CMA

- Roadway Speeds on CMP, except freeways
- Travel Times for O-D pairs

COMPLIANCE AND CONFORMANCE

Local agencies are encouraged to provide maintenance data to MTC or maintain their own database of maintenance needs on the MTS. However, there is no compliance requirements for local agencies or transit operators related to the Performance Element.

In the future, the CMA may consider using one or more performance measures in developing:

- Land Use Analysis Program: Tier II (review of cumulative effects of land developments)
- Environmental studies for transportation improvements
- Corridor studies
- The CMP Capital Improvement Program